Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of Cable Television Technical and Operational Requirements	MB Docket No. 12-217

COMMENTS OF THE NATIONAL ASSOCIATION OF TELECOMMUNICATIONS OFFICERS AND ADVISORS

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SUMMARY

The National Association of Telecommunications Officers and Advisors ("NATOA") applauds the Commission's launch of this proceeding and fully supports this effort to modernize the cable television technical standards to address digital technologies. In these comments, NATOA suggests changes to strengthen the Commission's proposals and proposes some additional rule changes based on its members' extensive experience with cable system inspection, testing, and problem-solving. NATOA members have decades of experience inspecting and testing cable systems, as well as enforcing the Commission's current cable proof-of-performance and technical standards. In addition, NATOA members have many years of experience resolving technical service complaints for digital cable subscribers.

The Commission should recognize that the purpose of the rules is to ensure an acceptable technical quality of delivered cable services, regardless of the technology used to deliver cable services. Thus, visual signal quality from the viewer's perspective, while not an objective standard, should remain as an overall requirement of any new standards adopted.

While NATOA agrees in general with the Commission's efforts to base new rules on recognized, objective industry standards, the Commission must recognize that industry standards are typically developed for use in testing in laboratory environments or prior to placing equipment into use (*i.e.*, acceptance testing as a final phase of construction). Thus, performance testing and technical standards applicable to active systems require reasonable adaptation of industry standards to field conditions. Performance testing should balance the needs to meet objective standards under real world conditions, to minimize the burden required to perform the tests, and also to minimize disruption for cable subscribers. In addition, the rules should address

changes required to ensure that the rules apply to national and regional systems, such as AT&T's U-Verse and Verizon's FiOS systems.

The Commission is also proposing conforming amendments to the technical standards for closed captioning, set top boxes, and channel repositioning. Because of the infrequent nature of Commission orders updating technical standards, NATOA takes the opportunity to suggest additional changes related to these issues as well in this proceeding.

NATOA supports the Commission's proposed changes and recommends the following additional changes:

Revise Testing Point & Channel Testing Requirements. Cable operators should run tests in each portion of a cable system served by a wire center or similar distribution point. Testing should not be required in local franchise areas with fewer than one thousand subscribers. A permanent optical network terminal ("ONT") should be installed at each test point. Diverse types of channels, such as public, educational, and governmental ("PEG"), local broadcast, channels in the FM band, and both standard definition and high definition digital channels, should be tested in proportion to their presence in the system. Local franchising authorities ("LFAs") should have the ability to require cable operators to include specific channels (for which complaints about channel signal quality have been received) among the channels tested.

QAM Technical Standards. NATOA recommends the modulation error ratio ("MER") of a channel be measured in lieu of the C/(N+I) ratio. The C/N ratio for AM VSB analog should be at least 46 dB. The manufacturer's phase noise specifications should be used instead of measuring phase noise on multiple individual channels. The carrier level at the terminal input should be -10 to +13 dBmV for all quadrature amplitude modulation ("QAM") transmissions.

Non-QAM Technical Standards. Cable operators seeking waivers for unconventional signal distribution technologies should notify LFAs and provide copies of their plans to the LFA for review.

Recordkeeping. Proof-of-performance records should be kept in electronic form.

Qualitative Measures. The Commission should require the use of consumer perception measures to assess signal quality. All channels tested for proof-of-performance should have a BER of at least 10^{-8}.

Signal Leakage. The Commission should expand the signal leakage testing requirements to the VHF band, retain the current reporting requirements, and expand the current reporting requirements to VHF band tests.

Additional Proposed Rule Changes. The same days, times, and procedures should be used for testing digital channels as are used for NTSC channels. The rules should ensure that QAM transmissions deliver closed-captioning to subscribers. Customers should be able to install CableCARDs without truck rolls. Franchising authorities should be notified at least thirty days prior to the deletion or repositioning of a PEG or broadcast channel, and their agreement should be required for any PEG channel repositioning.

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I. INTRODUCTION

The National Association of Telecommunications Officers and Advisors ("NATOA") applauds the Commission for initiating this proceeding and is pleased to submit comments in response to the Commission's Notice of Proposed Rulemaking in the above-cited docket ("Notice").[1]

NATOA is a national trade association that addresses local government issues in communications and serves as a resource for local officials as they seek to advance communications infrastructure. Its members are local communities that inspect cable facilities, enforce the Commission's technical standards, and address consumer complaints regarding cable service. NATOA members have extensive experience in evaluating signal problems, and analyzing system performance to resolve issues affecting cable customers.

NATOA members annually resolve hundreds of cable subscriber complaints regarding technical quality, reception, and outage issues. NATOA members review and/or are present to monitor current Commission proof-of-performance tests conducted by cable operators. NATOA

[1] *Cable Television Technical and Operational Requirements*, Notice of Proposed Rulemaking, MB Docket No. 12-217, FCC 12-86 (rel. Aug. 3, 2012).

members enforce national technical standards at the local level, although local franchise agreements may include specific reporting and response requirements. Thus, NATOA members are on the frontlines of implementing the Commission's technical standards and have decades of experience enforcing and using the Commission's rules to protect the rights of cable subscribers to be provided cable service of acceptable technical quality.

Most NATOA members have had some form of digital cable available within their franchise areas for almost a decade. Some aspects of existing standards apply to digital channels. But not all aspects of digital signal quality are captured by the existing standards. Thus, although the Commission has not updated its rules to address changes in digital technology, NATOA members have been using a combination of analog and digital testing equipment in the field to resolve technical quality cable complaints for many years. NATOA members have also had to modify – without benefit of federal updates – application of rules initially designed for local headend cable system architecture, to address the technical requirements of regionally- and nationally-based cable system architecture, such as that used by Verizon's FiOS and AT&T's U-Verse.

NATOA, therefore, welcomes the Commission's efforts to modernize its rules. NATOA members and cable system operators have also spent hundred of hours negotiating application of outdated rules. Cable operators have frequently argued for narrow interpretation of the Commission rules,[2] if not alleging that the rules do not apply at all, while NATOA members have generally argued that the rules should be interpreted to ensure that cable operators – including those that operate non-QAM systems – continue to deliver acceptable quality cable

[2] Cable operators have also attempted to add onerous conditions, such as requiring unacceptably restrictive non-disclosure agreements from vendors if local governments opt to use specialized contracted engineering support rather than in-house government employees to perform cable testing.

service to subscribers (who are being asked to pay ever more for new cable system technology and digital cable service). New digital technology has improved many technical aspects of cable service, but has also resulted in the emergence of new technical issues. Newer technology has not abrogated the need to ensure that cable subscribers receive cable service of acceptable technical quality.

In addition, cable operators, as advocates for their customers, and local governments, as advocates for all subscribers, are capable of agreeing on clear and enforceable digital standards, as was the case when the analog standards now in place were established. Such standards should not be unduly burdensome (for example, it should be possible to test signal quality without taking a cable system offline).

In its comments herein, NATOA proposes additional modifications to the Commission's proposed cable performance and technical standards rules. NATOA agrees with most of the Commission's proposals. Certain additional changes to the rules, however, are necessary to ensure that high-quality digital transmissions are provided to consumers. The majority of these changes to Sections 76.601 and 76.605 could be categorized as changes to address regionally- or nationally-based cable systems and refinement of technical standards as well as to address the differences between standards created for laboratory use and standards that must be applied in the field on equipment in active use. NATOA also recommends that signal leakage tests be performed in the VHF band based on the cable operators' expanded use of higher frequencies.

NATOA also proposes an additional requirement that non-QAM standards – submitted for the Commission to review on a case-by-case basis – should be supplied to the LFA to provide the LFA an opportunity to review and comment on such individual standards. LFAs are likely to have better information than Commission staff regarding the individual conditions in a specific

community. NATOA will review other non-QAM system proposals submitted by other commenters in this proceeding and will provide additional comments regarding non-QAM systems during the reply round.

Lastly, NATOA observes that in regard to technical standards, the Commission's typical pattern has been to open a proceeding to initially establish technical standards, but then to rarely issue subsequent orders to update existing technical standards (to reflect technological evolution) unless required to do so by statute. The Commission is proposing conforming amendments to the technical standards for closed captioning, set top boxes, and channel repositioning. Because of the infrequent nature of Commission orders updating these standards, NATOA takes the opportunity to suggest additional changes related to these issues as well in this proceeding.

NATOA's proposed modifications to the Commission's rules are found in the Appendix to these Comments.

NATOA again commends the Commission for opening a proceeding to address the important issues of performance and testing standards for modern cable systems and encourages the Commission to enact the new rules with all deliberate speed.

II. MODERNIZED TECHNICAL STANDARDS ADDRESSING DIGITAL TECHNOLOGIES ARE NECESSARY

As the Commission stated in the Notice, the current technical rules intended to ensure good signal quality for cable viewers and to minimize interference to licensees operating on cable spectrum were designed, for the most part, for analog rather than digital cable transmissions.[3] NATOA supports the Commission's efforts to update these rules to ensure subscribers receive acceptable quality of technical signals when watching digital cable television.

[3] *See* Notice at ¶ 3.

Modernizing the Commission's rules will also ensure that reception problems can be readily identified and addressed.

Some industry commenters may urge the Commission, as they have in other proceedings, to repeal those existing technical rules that no longer apply and *not* to replace them with digital standards.[4] This would not be prudent. The current rules may be of limited applicability because the standards created for analog systems need digital-equivalent standards, not, as the cable industry may contend, because there is no digital-equivalent to the analog problem that created the need to adopt standards in the first place. The transition to digital service has by no means eliminated signal problems. Consumers in many communities today are experiencing technical problems with their digital cable systems, including systems transmitting on optical fiber. For example, NATOA members have received numerous complaints from subscribers about frozen pictures, pixelation, tiling, audio dropout, and complete loss of signal. It often seems harder to diagnose and fix problems with digital service than it was in the analog era. Moreover, competition does not eliminate all technical issues nor obviate the need for enforceable standards. Rules are needed to ensure that cable operators provide the high-quality, reliable service for which their subscribers are paying.

It is also essential that the Commission recognize that federal rules are enforced at the local level. The Commission does not have the resources to make on-site visits and inspect individual cable connections. Local inspectors and engineers, on the other hand, perform independent field-testing of digital signals and work with cable providers to resolve their issues with subscribers. These local community experts ensure that cable operators meet clear standards set by the Commission. In turn, it is the Commission's duty to ensure that the

[4] *Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming*, MB Docket No. 12-203, Verizon Comments at 27 (filed Sept. 10, 2012).

Commission routinely reviews and issues updates to keep the federal rules relevant in the modern world.

III. PERFORMANCE TESTS (SECTION 76.601(b))

In the Notice, the Commission proposed certain changes to Section 76.601(b) of its rules, which, *inter alia*, identifies the number and location of the "test points" where cable operators must conduct proof-of-performance tests and specifies the number of channels that an operator must test. NATOA concurs with the Commission's proposed modifications to Section 76.601(b), but suggests additional changes to improve the rule.

Specifically, the current rules are based on the assumption that a separate cable system is located in each separate franchise area. Modern cable systems are a mix of local cable systems with local headends, regional cable systems that serve a dozen or two dozen large franchise areas (for example, Verizon contends that it is operating a single cable system to serve franchise areas from central Maryland to northern Virginia), systems with national super headends or hybrid systems (in which consolidation of cable systems has led operators to hold a mix of different types of systems). Therefore, NATOA proposes changes to the proposed rules to address the need to ensure that test points are geographically diverse and representative of the franchise areas they serve.

Furthermore, NATOA proposes that cable operators, particularly those using optical networks, install terminal equipment to permit field testing while the system is in operation, thus ensuring that testing of newer fiber optic systems would not be any more disruptive for viewers than testing of coaxial cable systems.

Lastly, NATOA recommends that the Commission's rules specify that cable operators be required to test a diverse range of types of channels and that local franchise authorities be

permitted on an as-needed basis to request that specific channels be tested. Complaints regarding technical quality often involve multiple subscriber complaints about specific channels – frequently local channels – placed in less desirable portions of the spectrum where they may be subject to more interference than other channels. In such circumstances, cable operators should be required to ensure that these channels meet minimum federal standards for signal quality.

A. Test Locations

NATOA supports the Commission's proposed amendment to the rule wherein the portion of the specifying the location of tests is amended to require at least one test point in each local franchise area. NATOA further suggests that this requirement be included as part of the overall requirement for a cable system, and further suggests that in both references, the requirement be qualified so that a test point is required in franchise areas *with 1,000 or more subscribers*. In addition, NATOA recommends that the reference to "microwave hub" be deleted and replaced with more inclusive language that captures other forms of cable distribution centers.

1. Add franchise area test point requirement to cable system reference with qualification that it is required in franchise areas with 1,000 or more subscribers

Section 76.601(b)(1) states that for "cable television systems with 1000 [sic] or more subscribers" proof-of-performance test measurements must be "taken at six (6) widely separated points." The current rule states that the test points "shall be balanced to represent all geographic areas served by the cable system" and the Commission is proposing to add further that the test points "should include at least one test point in each local franchise area." The rule further specifies that at least one-third of all test points must be most distant from the system input point.

Proposal. The geographic diversity requirements are important, as signal quality can be affected by the distance from the signal origination point. NATOA recommends that the

Commission's proposed amendment adding a requirement for a test point in each franchise area be added to the first sentence of the rule in which the testing requirement for a cable system is initially set forth. Moreover, NATOA recommends that this requirement be qualified so that a test point is required in every franchise area *with 1,000 or more subscribers.*

Rationale. By adding the 'test point in each franchise area with more than 1,000 subscribers' requirement to the first sentence, the Commission clarifies that cable systems must have test points in every franchise area. The language is not permissive but rather mandatory. However, the rule should be modified to mandate testing only in local franchise areas with 1,000 or more subscribers. A franchise area could be as small as a few hundred subscribers. In some areas of the country, small municipalities have separate franchises administered by larger political jurisdictions.[5] Some of these smaller franchise areas may only contain a few hundred residences or less. By adopting the overall requirement that at least one test point must be in a franchise area with more than 1,000 subscribers, retaining the balance of geographic areas requirement, and by requiring at least one test point per distribution center as discussed below, the rules would ensure that a sufficient number of test points are located within larger franchise areas served by multiple distribution centers, as well as that a sufficient number of test points are located within smaller franchise areas. Given the relatively large number of different locations where testing will be taking place in many cable service areas, NATOA feels that it is not necessary, and would be burdensome, to require cable operators to take measurements in all local franchise areas, even those that have fewer than 1,000 subscribers.[6]

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[5] For example, Prince George's County, Maryland serves as the local franchising authority for, and administers the cable franchises on behalf of, twenty-two other Maryland municipalities located within the boundaries of the County.

[6] That is, the smaller local franchise areas contained geographically within a larger franchise area.

2. Update "hub" reference in Section 76.601(b)(1)

Section 76.601(b)(1) specifies that a cable operator must conduct proof-of-performance tests in at least one location in each portion of its system served by a technically integrated hub.

Proposal. NATOA suggests expanding the rule to include testing in each portion of a cable system served by a wire center, central office, hub, or similar distribution center.

Rationale. Because cable programming is increasingly being transmitted through regional facilities, each of which could serve tens of thousands of subscribers, NATOA proposes expanding the rule to include testing in each portion of a cable system served by a wire center, central office, hub, or similar distribution center. Testing at these additional locations is important because any of those distribution facilities introduces a single point for signal impairments that may impact the large number of subscribers they serve.

B. Require Installation of Permanent Optical Network Terminals to Serve as Subscriber Terminal Test Points

Section 76.601(b)(1) also discusses where test points should be located — *e.g.*, at least one-third of test points must be representative of *subscriber terminals* most distant from the cable system input. Enforcement of this standard is more difficult to enforce in newer fiber optic cable systems because the cable operator does not install subscriber terminals to facilitate testing.[7]

[7] In coaxial cable systems, the subscriber taps are located throughout the system and can serve as subscriber test points to enable testing without disrupting the signal to the subscriber. For fiber optic systems, the lightwave signal must be converted to an RF signal to enable testing. This conversion occurs only at terminal points. If there is no specifically installed terminal, service must be interrupted at a terminal point serving a subscriber to permit testing. Some local governments have attempted to address this issue by requiring a limited number of ONTs to be installed for testing purposes at locations where the cable operator agreed to provide service as a provision of a franchise agreement.

Proposal. NATOA proposes that for all fiber optic systems, cable operators should install a permanently mounted optical network terminal (ONT)[8] at each test point.

Rationale. Installing these devices at each test location will permit a franchising authority to verify measurements and will make it quicker and easier for operators to conduct their proof-of-performance tests. Without permanently installed ONTs, the franchisee cannot verify measurements. Operators must transport portable ONTs to many test points within their service areas and, at each location, install and uninstall the devices. The cost of permanent ONTs should be minimal and will save operators considerable time and effort in conducting their tests.

C. Require Representative Diversity of the Types of Channels Tested

1. Diversity of the types of channels tested under Section 76.601(b)(2)

Section 76.601(b)(2) discusses the number and type of NTSC channels on which proof-of-performance measurements should be made — *e.g.*, the channels selected for testing must be representative of all the channels within the cable television system.

Proposal. NATOA agrees with the number of channels proposed. In addition, NATOA recommends that the channels tested include local broadcast television, PEG, and cable programming service channels in the same proportion as each type of channel is present in the cable system, and shall include at least one channel in the 88-108 MHz frequencies if channels in that band are occupied.

Rationale. The local broadcast channels are highly viewed channels, and the PEG channels are sometimes located on less desirable frequencies that impair reception of PEG

[8] *See* G.984 PON standard.

programming. The frequency range of 88–108 MHz is occupied by broadcast FM radio services that can significantly affect reception of cable channels located in this frequency range.

2. Diversity of the types of digital channels tested under Section 76.601(b)(3)

Section 76.601(b)(3) discusses the number and type of digital, QAM channels where proof-of-performance measurements should be made.

Proposal. NATOA agrees with the number of channels proposed, but recommends that the types of digital channels tested include local broadcast television, PEG, and cable programming channels in the same proportion as these channels are present in the cable system; at least one channel in the FM band (88-108 MHz), if channels in that band are occupied; and other types of channels — standard definition, high definition, three-dimensional, evolving ultra-high definition, and other similarly enhanced channels – in the same proportion as those channels are present in the cable system.

Rationale. As discussed above, it is important to test a representative number of local broadcast channels and PEG channels and at least one channel in the FM band, if it is occupied. But it is also important to test different types of digital channels — standard definition and the various types of enhanced digital transmissions — in the same proportion as those channels are present in a cable system. Doing so is far more likely to reveal any problems associated with the reception of these transmissions within the system.

IV. TECHNICAL STANDARDS (SECTION 76.605(c) and (e))

A. Proposed Modifications to Section 76.605(c)

As the Commission indicates in the Notice, digital transmissions on cable systems are largely accomplished today through QAM modulation.[9] Proof-of-performance testing on digital channels must be capable of measuring QAM signals. The Commission proposed that its rules be updated to adopt, by incorporation, the most current versions of relevant technical standards.[10] Among these updates, the Commission proposed that the requirements of ANSI/SCTE standard 40 2011 ("Digital Cable Network Interface Standard") apply to the testing of QAM channels and that testing such channels be performed using the RF characteristics delineated in Table 4 of the standard. NATOA agrees with the use of ANSI/SCTE 40 2011 as a basis for testing QAM channels, but suggests that the Commission qualify the use of Table 4 by incorporating the following modifications.

1. Table 4, Item 4 (C/(N+I) Values)

Item 4 of the table identifies the C/(N+I) values that must be achieved for 64 QAM and 256 QAM transmissions.

Proposal. NATOA proposes that the Modulation Error Ratio (MER) of a channel be measured in lieu of the C/(N+I) ratio on the channel.[11]

Rationale. To measure the C/(N+I) ratio on a particular channel, the channel must either be near an open channel or must be temporarily taken out of service. Measuring the MER of a channel, however, avoids these limitations *and* maintains the integrity of the two required C/(N+I) ratios in the rule — *i.e.*, 27 dB for 64 QAM transmissions and 33 dB for 256 QAM

[9] *See* Notice at ¶ 5.

[10] *See* Notice at ¶ 43.

[11] *See* NATOA's proposed new Section 76.605(c)(1)(i).

transmissions. This is because MER, by definition, can never be mathematically less than C/(N+I). Therefore, the required 27 dB and 33 dB C/(N+I) ratios for 64 QAM and 256 QAM channels will always be satisfied so long as the measured MER values are at least 27 dB and 33 dB, respectively.

2. Table 4, Item 4 (AM VSB)

Item 4 of the table also indicates that, for AM VSB analog transmissions, the carrier-to-noise (C/N) ratio shall be not less than 43 dB.

Proposal. NATOA proposes that the C/N ratio for AM VSB analog transmissions be at least 46 dB.[12]

Rationale. The 43 dB specification was adopted a number of years ago, when a lesser picture quality might have been considered acceptable. Even then, it was a very minimal standard. To provide the higher picture quality expected by consumers today, NATOA believes a minimum C/N ratio of 46 dB for analog transmissions is more appropriate.

3. Table 4, Item 11 (Phase Noise)

Item 11 of the table indicates the maximum permissible level of phase noise, as measured 10 kHz from the center of a QAM signal.[13]

Proposal. NATOA proposes that rather than measuring phase noise on multiple individual channels, the manufacturer's phase noise specifications for the modulators and microwave equipment should be the standard used to meet this measurement requirement.

Rationale. The distribution system does not affect phase noise. If channels are delivered via microwave, it is the microwave system that adds phase noise to all channels before the channels are transmitted over the distribution network. Further, to make this measurement all

[12] *See* NATOA's proposed new Section 76.605(c)(1)(ii).

[13] *See* NATOA's proposed new Section 76.605(c)(1)(iii).

modulation must be removed, the QAM carrier re-inserted, and the measurement taken with a laboratory spectrum analyzer. This presents several problems. In addition to having to temporarily remove programming from the channel, most modulators in use today do not have the capability to insert a QAM carrier. Regardless, cable operators do not typically use the very expensive and technically sophisticated laboratory analyzers capable of measuring the required phase noise in the field. NATOA therefore believes the rules regarding the phase noise measurement requirement should be based on the modulator's manufacturer specifications.

4. Table 4, Item 14 (Carrier Level)

Item 14 of the table identifies the required carrier level at the terminal input. The minimum carrier level is: -15 to +15 dBmV for 64 QAM transmissions; and -12 to +15 dBmV for 256 QAM transmissions.

Proposal. NATOA proposes that the carrier level at the terminal input be -10 to +13 dBmV for all QAM transmissions.[14]

Rationale. These levels allow additional "head room" for reasonable measurements instead of the carrier level requirements for set-top converters in use today.

B. Proposed Modification to Section 76.605(e)

Section 76.605(e) stipulates that cable operators employing unconventional signal distribution technologies (*i.e.*, other than 6 MHz NTSC or QAM systems) and who cannot comply with one or more proof-of-performance standards may obtain approval from the Commission to operate without satisfying those standards. NATOA supports and endorses the Commission efforts to ensure that cable system technical standards are applicable to non-QAM cable systems. Such efforts provide regulatory clarity, promote competitive neutrality, and

[14] *See* NATOA's proposed new Section 76.605(c)(1)(iv).

ensure that subscribers to such non-QAM systems enjoy technical and signal quality protections comparable to those enjoyed by subscribers to more traditional QAM-based systems.

Proposal. NATOA is not opposed to allowing cable operators employing unconventional technologies to seek Commission approval to operate their systems if and when they are unable to meet one or more technical standards. However, NATOA proposes certain additional requirements in those cases. Specifically, the Commission should require that cable operators, prior to submitting their proof-of-performance plans to the Commission for approval, notify the local franchising authority of their intent and provide a copy of the plan to the LFA for review. NATOA also proposes a requirement that the operator's submission to the Commission include documentation that the plan has been provided to the LFA for its review and concurrence, including any comments the LFA may have provided.[15]

The purpose of the statutory requirement that grants the Commission exclusive jurisdiction to establish technical standards is to prevent the development of multiple technical standards as well as variance of technical standards based on non-technical factors, such as political jurisdiction boundaries.[16] When the Commission is seeking to establish non-uniform, case-by-case standards, the Commission's assessment of the benefits of any proposed standard may benefit by receiving input from the local franchising authority inspection and engineering staff and contractors who are familiar with technical issues specific to that non-QAM system. The majority of LFAs do not have resources to track daily filings at the Commission. Thus, requiring the cable operator to notify the LFA prior to submission and to permit the LFA a

[15] NATOA proposes two small, additional edits to Section 76.605(e). First, *fiber* should be added to the list of cable television distribution media identified in the rule. Second, the rule should clearly state that cable operators who cannot comply with all required technical standards will be allowed to operate their systems *only* if they receive Commission approval to do so.

[16] 47 U.S.C. §544; *New York v. FCC*, 486 U.S. 57, 60 (1988); H.R. Rep. No. 98-934, p. 70 (1984).

timely opportunity to comment on the cable operator's proposal is a reasonable means to address this issue.

V. RESPONSES TO OTHER REQUESTS FOR COMMENT IN THE NOTICE

A. Recordkeeping

In paragraph 22 of the Notice, the Commission sought comment on what changes, if any, should be made to its recordkeeping rules. Section 76.1704 currently requires that results of proof-of-performance tests be kept on file at the operator's local business address for at least five years, and that test data be made available for inspection by the Commission or the local franchiser, upon request.[17]

Proposal. NATOA proposes that proof-of-performance records also be kept in electronic format, which can be accessed by franchisees and other interested parties.

Rationale. Proof-of-performance records must currently be placed in the operator's public file and be available for inspection and copying by interested parties at specified locations. The ability to access proof-of-performance records electronically will dramatically increase their availability to the public and eliminate the travel and copying costs now associated with acquiring paper records. Many cable operators already maintain their proof-of-performance records electronically, and it should not be a significant burden for those who do not to put their records into electronic format. Electronic records will be more environmentally sound and provide a more "state-of-the-art" methodology.

[17] This requirement does not apply to cable television systems having fewer than 1,000 subscribers.

B. Qualitative Signal Quality Measures

In paragraph 9 of the Notice, the Commission sought comment on whether it should employ qualitative measures to assess video quality. Specifically, it asked whether it should consider the use of subjective consumer perception measures to assess signal quality instead of, or in addition to, the use of objective measurements.

Proposal. NATOA believes that the Commission should require the use of subjective consumer perception measures for assessing signal quality.

Rationale. Even though proof-of-performance test results may exceed minimum technical standards, customers may still see disruptions in signal quality — *e.g.*, "pixelation," "tearing," or loss of audio (all of which can result from master head-end or programmer deficiencies or channel over-compression) – and annoying variations in the loudness of different channels. All of these signal impairments could be observed on a television with a set-top box. Each channel tested for proof-of-performance should be observed for at least two minutes and the results of this observation recorded. The cost of this approach would be minimal and it could identify problems not evident in signal quality measurements, resulting in increased customer satisfaction.

C. Industry Standards for Signal Quality in Non-QAM Systems

In paragraph 14 of the Notice, the Commission sought comment on whether there are appropriate industry standards against which to determine signal quality in non-QAM systems. Among other things, the Commission asked whether objective methods exist to establish whether "good quality signals" are reaching cable subscribers of non-QAM systems, including an analysis of errors in the transmission of the compressed video stream, and a means by which to measure perceived visual signal quality.

Proposal. An analysis of errors in the transmission of the compressed video stream and a means by which to measure perceived visual signal quality could result in overall improved picture quality. But, as with QAM systems, consumer perception measures should also be used for assessing signal quality.[18] NATOA will review non-QAM standards proposed by other commenters in this proceeding and will provide additional comments regarding non-QAM systems during the reply round.

Rationale. Even though proof-of-performance test results may exceed minimum technical standards, customers may still see disruptions in signal quality — *e.g.*, "pixelation," "tearing," or loss of audio (all of which can result from master head-end or programmer deficiencies or channel over-compression) — and annoying variations in the loudness of different channels. All of these signal impairments could be observed on a television with a set-top box. NATOA proposes that each channel tested for proof-of-performance be observed for at least two minutes and the results of this observation recorded. The cost of this approach would be minimal, and it could identify video or audio problems not evident in signal quality measurements, resulting in increased customer satisfaction.

D. Role of Set-Top Boxes

In paragraph 24 of the Notice, the Commission sought comment on what role, if any, set-top boxes should play in the Commission's efforts to ensure that consumers receive good quality signals.

Proposal. Because the same signal impairments discussed in Item V.B., above, could be observed on a television with a set-top box, NATOA believes that the Commission should

[18] As with QAM channels, each non-QAM channel tested for proof-of-performance should be observed for at least two minutes.

require the use of the same consumer perception measures for assessing signal quality proposed in Item V.B. for televisions with set-top boxes. The cost would be minimal and could identify problems not evident in the signal quality measurements, providing higher customer satisfaction.

Rationale. As described in item V.C. above.

E. Additional Metrics

SCTE 40 2011 contains tables describing the various metrics that would have to be satisfied to achieve compliance with the standard. In paragraph 12 of the Notice, the Commission sought comment on whether additional metrics, such as the measurement of visual signal quality or the MPEG stream, should be added to these existing ones.

Proposal. NATOA proposes that the bit error ratio (BER) be measured on all channels being tested for proof-of-performance, and that the measured BER should be at least 10^{-8}.[19]

Rationale. A BER of 10^{-8} is readily achievable and would help ensure the reception of a reliable signal. Furthermore, the measurement of BER would take very little additional time and is currently performed by many cable operators.

F. Signal Leakage

In paragraph 38 of the Notice, the Commission sought comment on whether the signal leakage performance criteria rules are sufficient, whether or not the rules need to be amended to protect more frequencies, and whether to maintain the requirement that the test frequency be located within the 108-137 MHz band.

Proposal. NATOA concurs with the signal leakage level criteria rules within the aeronautical band. However, NATOA suggests that consideration be given to expanding the signal leakage performance test criteria to the UHF portions of the of cable system bandwidth.

[19] This requirement is described in NATOA's proposed new Section 76.605(c)(2)(iii).

NATOA further believes that record keeping requirements – including the requirements that tests be performed every three months, that tests be reported to the Commission once per year, and the duration of time that records must be kept – should remain and be amended to apply to testing in both the VHF aeronautical band and UHF band within the cable system operational bandwidth.

Rationale. When the rules were originally established the cable system upper bandwidth was 400 MHz or less. Presently, most cable systems are operating with bandwidths of 750 MHz to 1 GHz. Interference in this band was not much of an issue until recently when recent studies in this field have revealed that there may be little or no correlation between the signal leakage in 108-137 MHz aeronautical band and in the UHF band, *i.e*., when UHF frequency leakage exists, there may be little or no measureable leakage at VHF frequencies, and vice versa.[20] NATOA notes that, at the time of adoption of the current rules, much of the UHF spectrum was principally assigned to support over the air television broadcasting. Currently there is an ongoing process by the Commission to reassign the spectrum to support an ever expanding broadband communications industry as well as critical public safety communications services. Therefore, it is important to measure signal leakage in both the UFH and VHF bands.

VI. OTHER PROPOSED RULE MODIFICATIONS

In addition to the proposals offered in Sections III, IV, and V above, NATOA suggests certain additional modifications to the Commission's proposed rules. NATOA suggests requiring that the frequency of performance testing and "visual signal level" requirements used for NTSC signals be extended to QAM signals. Moreover, the Commission is proposing conforming amendments to the technical standards for closed captioning, set top boxes, and

[20] Ron Hranac and Greg Tresness, Another Look at Signal Leakage – The Need to Monitor at Low and High Frequency, presented at the Society of Cable and Telecommunications Engineers CABLE-TEC Expo '12, Orlando, FL (Oct. 17-19, 2012).

channel repositioning. Because of the infrequent nature of Commission orders updating these standards, NATOA takes the opportunity to suggest additional changes related to closed captioning and set top boxes in this proceeding as well.

A. Frequency of Proof of Performance Testing for QAM Channels

Section 76.601(b)(2)(i) specifies exactly when, and how often, semi-annual proof-of-performance tests must be conducted of the "visual signal level" for NTSC channels.

Proposal. NATOA proposes that a similar rule be added to paragraph 76.601(b)(3) that addresses proof-of-performance testing for digital (QAM) channels. Specifically, a new Section 76.601(b)(3)(i) would identify the same days and times for the testing of "signal level" for digital channels as currently appear in Section 76.601(b)(2)(i) for the testing of "visual signal level" for NTSC channels.

Rationale. The variance in signal levels is determined by the system stability. The digital levels require the same or more stability as the NTSC channels. If the digital levels decrease during the day and levels are near the minimum required level, the digital signals may drop enough to make the virtual channels pixelate or drop out completely.

B. Visual Signal Level Technical Standard for QAM Channels

Section 76.605(b)(4) describes the technical standard for the measurement of the visual signal level of each NTSC channel (*e.g.*, the visual signal level must not vary more than 8 decibels within any six-month interval; measurement of the signal must be made at the end of a 30 meter cable drop connected to a subscriber tap).

Proposal. NATOA proposes that a similar rule be added to paragraph 76.605(c), which describes the technical standards for the measurement of digital (QAM) signals. Specifically, a new paragraph added to Section 76.605(c) would provide the identical procedures for the

measurement of digital signal levels as are currently prescribed in Section 76.605(b)(4) for the measurement of NTSC visual signal levels.[21]

Rationale. The variance in signal levels is determined by the system stability. The digital levels require the same or more stability as the NTSC channels. If the digital levels decrease during the seasonal climate changes and levels are near the minimum required level, the digital signals may drop enough to make the virtual channels pixelate or drop out completely.

C. Closed Captioning.

Section 76.606 describes closed-captioning requirements that must be performed by cable system operators. Specifically, it states that operators shall not take any action to remove or alter closed-captioning data contained on line 21 of the vertical blanking interval and shall deliver intact closed-captioning data contained on line 21 of the vertical blanking interval, as it arrives at the head-end or from another origination source, to subscriber terminals and (when so delivered to the cable system) in a format that can be recovered and displayed by decoders meeting the requirements of § 79.101 of this chapter.

Proposal. NATOA proposes that similar requirements be added to Section 76.606 to ensure that digital (QAM) transmissions deliver sufficient quality closed-captioning to subscribers.[22]

Rationale. This requirement will ensure closed-captioning is delivered to subscribers on both digital and analog systems. Cable operators should not take any action to remove or alter closed-captioning data contained in the digital signal and should deliver intact closed-captioning

[21] The procedure is described in NATOA's proposed new Section 76.605(c)(2)(ii).

[22] *See* NATOA's proposed revisions to Section 76.606.

data as it arrives at the head-end or from another origination sources, to subscriber terminals and in a format that can be recovered and displayed by decoders and televisions.

D. CableCARD Support

Section 76.1205 describes the rules for CableCARD support.

Proposal. NATOA proposes that CableCARDs should be able to be installed by customers without cable operator truck rolls.[23]

Rationale. Subscribers without external set-top boxes may be required to pay monthly and activation charges for CableCARDs. NATOA's experience to date suggests that many subscribers have had difficulty in installing and initializing CableCARDs. NATOA proposes that cable operators should be required to provide simple, comprehensive directions for customer installation of CableCARDs, and/or provide initial installation of Cable CARDs to subscribers at no charge.

E. Notice of Channel Deletion/Repositioning

Section 76.1601 states that cable operators must provide written notice to any broadcast television station at least 30 days prior to either deleting from carriage or repositioning that station and that such notification must also be provided to subscribers of the cable system.

Proposal. NATOA proposes that franchising authorities also be notified at least 30 days prior to the deletion or repositioning of a broadcast channel by a cable operator. In addition, any PEG channel repositioning should have to be agreed to by the franchising authority. If the franchising authority agrees to the repositioning, then notification should be provided to subscribers of the cable system, at least 30 days prior to the repositioning of the channel.

[23] This requirement is described in NATOA's proposed new Section 76.1205(d).

Rationale. Operators of local PEG channels expend considerable resources to ensure that viewers are familiar with their channel locations. Any change in PEG channel location could make it potentially difficult for viewers to find the channel, or, worse, make viewers think the channel is no longer on the air.

VII. CONCLUSION

For the reasons indicated above, the Commission should adopt the proposed rules, with the changes described in the Appendix to these Comments.

Respectfully submitted,

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